LISTING OF SPECIFICATION AMENDMENTS

Page 16, First Paragraph, Line 4

passes through a 90° phase shifter 509 (to allow quadrature detection) and a narrow band filter 510, which selects only the carrier and rejects the frequency-shifted phase-modulated sidebands. The selected carrier is then mixed with the other split part of the return signal in mixer 508. Narrow band filter ~~509~~ 510 is preferably based on a quartz crystal oscillator.

Page 11, First and Second Paragraphs

Figure 1 illustrates the basic operation of a preferred ultrasonic fluid probe system of the present invention employing a single transducer and a free-standing fluid stream as an ultrasonic waveguide. Driver 101 provides an electrical signal of carrier frequency f_c to transducer 102, which is mounted through a wall of chamber 103. As indicated by the arrows in Fig. 1, pump 104 causes a fluid to flow from fluid source 105 into chamber 103 via inlet 106, past baffle 107, and through outlet 108 in chamber 103 to produce fluid stream 109 that impinges target 110, which is depicted as a cutting tool but may also be a workpiece. Ultrasonic carrier beam 111 produced by transducer 102 is propagated along fluid stream 109 to target 110. Return ultrasonic beam 112 reflected from target 110 and modulated by vibration frequency f_v of target 110 is guided back to transducer 102 via fluid stream 109. Transducer 102 converts return ultrasonic beam 112 into return electrical signal $f_c \pm f_v$, which is directed to demodulator 113 by directional coupler 114. Typically, demodulator 113 is a phase demodulator, which converts ultrasonic spectrum 120 to ultrasonic spectrum 130. The output signal corresponding to the surface velocity component can be significantly increased by increasing the length of fluid stream 109. A similar signal enhancement can be obtained by introducing an electrical time delay into the signal path via analog electronic means or via a separate ultrasonic delay line 140. Chamber 103 is preferably shaped so as to provide laminar fluid flow within fluid stream 109. Suitable results are provided by a cylindrical chamber with one end tapered in a cone to the diameter of the fluid stream. The cross-sectional area of inlet 106 should be larger than that of outlet 108. An accelerometer 115

mounted on chamber 103 or on transducer 102 (indicated by box with dashed sides) may be included in the device to permit the effects of transducer vibration to be taken into account so as to improve the accuracy and precision of vibration measurements according to the present invention. Typically, the measured acceleration is integrated twice to obtain a displacement signal, which is used to correct the signal from the ultrasonic probe for vibration of the transducer.

~~Although not~~ As also shown in Fig. 1, a second transducer 102a may be used to detect return ultrasonic beam 112. In this case, directional coupler 114 is not needed. ~~The s~~ Second transducer 102a is preferably placed side-by-side or coaxially (as shown) with transducer 102.

CONCLUSIONS

In consideration of the amendments made to the claims, specification and drawings discussed above, it is respectfully requested that all of the claims, as amended, be allowed. It is further requested that the replacement drawings and amendments to the specification be accepted. No new matter has been added.

Respectfully submitted,

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